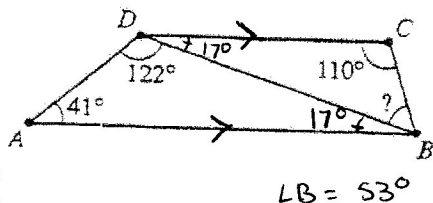


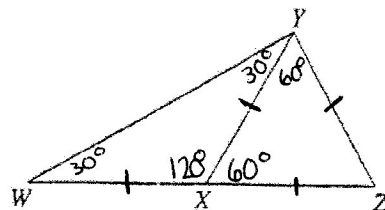
29. In the figure below,  $\overline{AB} \parallel \overline{DC}$ ,  $\angle A$  measures  $41^\circ$ ,  $\angle C$  measures  $110^\circ$ , and  $\angle ADE$  measures  $122^\circ$ . What is the measure of  $\angle CBD$ ?



- A.  $17^\circ$   
B.  $41^\circ$   
C.  $53^\circ$   
D.  $63^\circ$   
E.  $69^\circ$

$$\angle B = 53^\circ$$

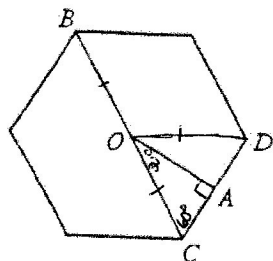
35. In the figure below,  $X$  is the midpoint of  $\overline{WZ}$  and  $\triangle XYZ$  is an equilateral triangle. What is the measure of  $\angle WYZ$ ?



- A.  $60^\circ$   
B.  $75^\circ$   
C.  $90^\circ$   
D.  $105^\circ$   
E.  $120^\circ$

$$\angle WYZ = 30^\circ + 60^\circ$$

28. In the regular hexagon below, vertices  $B$ ,  $C$ , and  $D$  are labeled;  $\overline{OA}$  is perpendicular to  $\overline{CD}$ ;  $A$  is the midpoint of  $\overline{CD}$ ; and  $O$  is the midpoint of  $\overline{BC}$ . What is the degree measure of  $\angle AOC$ ?

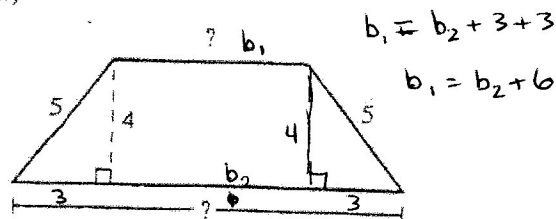


- F.  $15^\circ$   
G.  $20^\circ$   
H.  $30^\circ$   
J.  $45^\circ$   
K.  $60^\circ$

$$\angle AOC = 30^\circ$$

34. The trapezoid below, with dimensions given in inches, has an area of 36 square inches. What are the lengths, in inches, of the bases of the trapezoid?

(Note:  $A = \frac{1}{2}h(b_1 + b_2)$  is a formula for the area of a trapezoid.)



- F. 4 and 14  
G. 6 and 9  
H. 6 and 12  
J. 8 and 10  
K. 9 and 9

$$A = \frac{1}{2}h(b_1 + b_2)$$

$$36 = \frac{1}{2} \cdot 4(b_1 + b_2)$$

$$36 = 2(b_1 + b_2)$$

$$18 = b_1 + b_2$$

$$18 = (b_2 + 6) + b_2$$

$$12 = 2b_2$$

$$6 = b_2$$

check

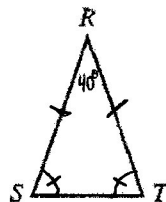
$$\frac{1}{2} \cdot 4(6 + 12) \\ 2(18) \\ 36 \checkmark$$

$$b_1 = b_2 + 6 \leftarrow$$

$$b_1 = 6 + 6$$

$$b_1 = 12$$

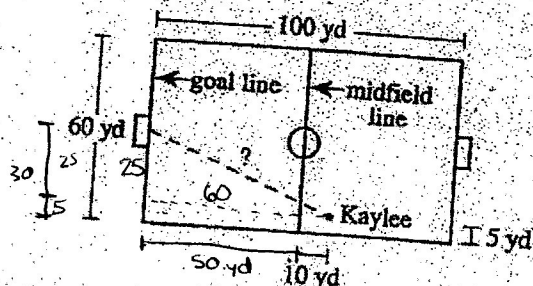
7. In  $\triangle RST$ , shown below,  $\overline{RS} \cong \overline{RT}$ , and the measure of  $\angle R$  is  $40^\circ$ . What is the measure of  $\angle S$ ?



- A.  $20^\circ$   
B.  $40^\circ$   
C.  $50^\circ$   
D.  $70^\circ$

E. Cannot be determined from the given information

46. When Kaylee kicked the winning soccer goal, she was 10 yards behind the midfield line and 5 yards from the sideline, as shown in the figure below. To the nearest yard, how far was Kaylee from the center of the goal line when she kicked the winning goal?

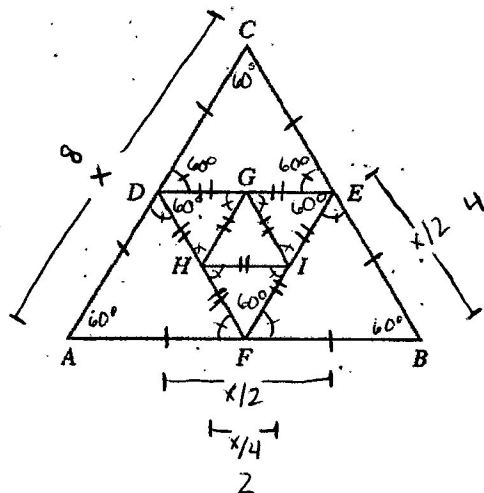


- F. 60  
G. 65  
H. 67  
J. 70  
K. 72

$$25^2 + 60^2 = 4225$$

$$\sqrt{4225} = 65$$

31. In the figure below,  $\triangle ABC$  is equilateral. Points  $D$ ,  $E$ , and  $F$  are the midpoints of the sides of  $\triangle ABC$ . Points  $G$ ,  $H$ , and  $I$  are the midpoints of the sides of  $\triangle DEF$ . A side of  $\triangle ABC$  is how many times as long as a side of  $\triangle GHI$ ?



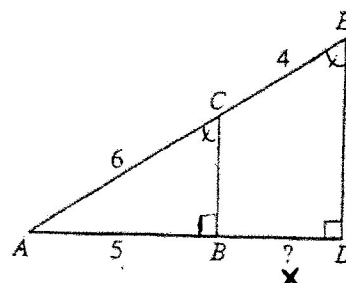
- A. 2  
B. 3  
C. 4  
D. 8  
E. 16

$$AC : GH$$

$$8 : 2$$

$$4 : 1$$

57. In right triangle  $\triangle ADE$  shown below,  $C$  is on  $\overline{AE}$ ,  $B$  is on  $\overline{AD}$ , and  $\overline{BC}$  is parallel to  $\overline{DE}$ . The dimensions given are in centimeters. How many centimeters long is  $\overline{BD}$ ?



- A.  $\frac{10}{3}$   
B.  $\frac{24}{5}$   
C.  $\frac{25}{3}$   
D. 3  
E. 5

$$\frac{4}{6+4} = \frac{x}{x+5}$$

$$4(x+5) = (6+4)(x)$$

$$4x + 20 = 10x$$

$$20 = 6x$$

$$\frac{10}{3} = \frac{20}{6} = x$$

2. A point at  $(-3, 7)$  in the standard  $(x, y)$  coordinate plane is shifted down 3 units and right 7 units. What are the coordinates of the new point?

F.  $(-10, 10)$   
 G.  $(0, 0)$   
 H.  $(4, 4)$   
 J.  $(4, 10)$   
 K.  $(10, 10)$

$(-3, 7)$   
 $+7 \quad -3$   
 $(4, 4)$

25. To check the slope of a ramp, a building inspector places an overlay of the standard  $(x, y)$  coordinate plane on the construction blueprint so that the  $x$ -axis aligns with the horizontal on the blueprint. The line segment representing the side view of the ramp goes through the points  $(1, -3)$  and  $(14, 2)$ . What is the slope of the planned ramp?

A.  $-\frac{1}{15}$   
 B.  $-\frac{1}{13}$   
 C.  $-\frac{1}{6}$   
 D.  $\frac{5}{13}$   
 E.  $\frac{13}{5}$

$\frac{2 - (-3)}{14 - 1} = \frac{5}{13}$

28. What is the midpoint of a line segment whose endpoints have coordinates  $(-5, 3)$  and  $(15, -9)$  in the standard  $(x, y)$  coordinate plane?

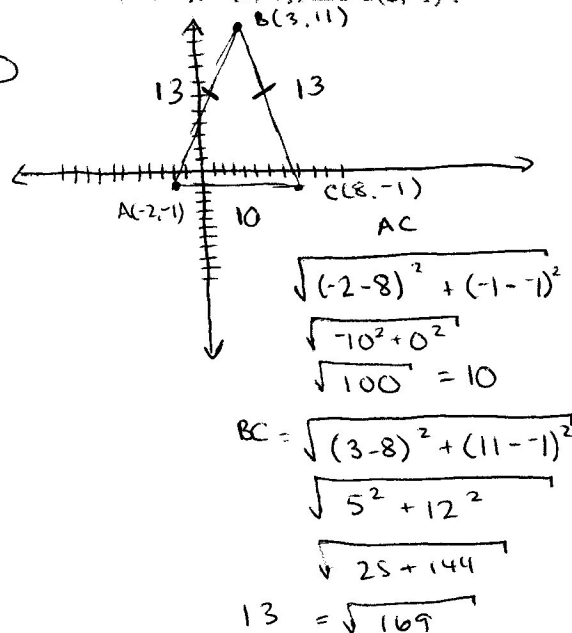
F.  $(-2, 6)$   
 G.  $(-1, 3)$   
 H.  $(5, -3)$   
 J.  $(10, -6)$   
 K.  $(10, 6)$

$\left( \frac{-5 + 15}{2}, \frac{3 + (-9)}{2} \right)$

$\left( \frac{10}{2}, \frac{-6}{2} \right)$   
 $(5, -3)$

39. In the standard  $(x, y)$  coordinate plane, what is the perimeter, in coordinate units, of an isosceles triangle having vertices  $A(-2, -1)$ ,  $B(3, 11)$ , and  $C(8, -1)$ ?

A. 23  
 B. 33  
 C. 36  
 D. 44  
 E. 55



39. What is the slope of the line through  $(2, -5)$  and  $(-3, 4)$  in the standard  $(x, y)$  coordinate plane?

A.  $-\frac{9}{5}$

B.  $-\frac{5}{9}$

C.  $\frac{1}{9}$

D.  $\frac{9}{5}$

E. 9

$$\frac{4 - (-5)}{-3 - 2} = \frac{4 + 5}{-5} = -\frac{9}{5}$$

30. The coordinates of the endpoints of  $\overline{JK}$ , in the standard  $(x, y)$  coordinate plane, are  $(-2, -6)$  and  $(4, 6)$ . What is the  $x$ -coordinate of the midpoint of  $\overline{JK}$ ?

F. 0

G. 1

H. 2

J. 3

K. 6

$$\left( \frac{-2 + 4}{2}, \frac{-6 + 6}{2} \right)$$

$$\left( \frac{2}{2}, \frac{0}{2} \right)$$

$$(1, 0)$$

39. On a map of Blueville in the standard  $(x, y)$  coordinate plane, where 1 coordinate unit represents 1 block, the middle school is at  $(-8, 3)$  and the high school is at  $(4, -2)$ . What is the straight-line distance, in blocks, between the high school and the middle school?

A. 13

B. 17

C.  $\sqrt{7}$

D.  $\sqrt{13}$

E.  $\sqrt{17}$

$$\sqrt{(-8 - 4)^2 + (3 - (-2))^2}$$

$$\sqrt{(-12)^2 + 5^2}$$

$$\sqrt{144 + 25} = \sqrt{169} = 13$$

58. A trapezoid with  $\overline{RQ}$  parallel to  $\overline{OP}$  and  $\overline{RO}$  congruent to  $\overline{QP}$  is shown in the standard  $(x, y)$  coordinate plane below. What is the  $x$ -coordinate for point  $R$  in terms of  $f$  and  $g$ ?

HL congruence

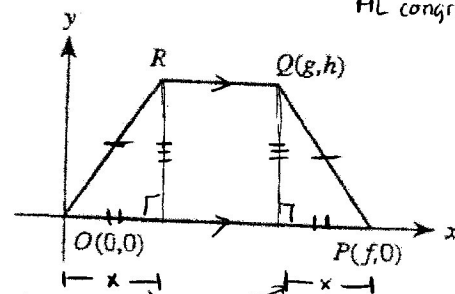
F.  $\frac{f+g}{2}$

G.  $f-g$

H.  $g-f$

J.  $2f-g$

- K. Cannot be determined from the given information



$$x = f - g$$

